Landsat 7 Processing System (LPS)

Critical Design Review

November 17, 1995

Landsat 7 Processing System CDR

Agenda

• Introduction	J. Henegar
• Design Overview	R. Schweiss T. Aslam
• LPS Hardware Architecture	C. Brambora
• LPS Operational Scenarios	R. Schweiss
• SWCI Detailed Design	J. Hosler D. Crehan
• System Testing	J. Henegar
• Acceptance Testing	EDC
• Facilities	EDC
• Conclusion	J. Henegar

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Purpose and Scope Documentation SDR/SSR Followup Context Diagram	
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LPS CDR Technical Review Panel

- **Ludie Kidd/510 Chair**
- **Jim Andary/430**
- **Bill Potter/511**
- **Jim Irons/923**
- **Armen Caroglanian/531**
- **Ted Ackerson/505**
- **John Boyd/EDC**
- **Mike Mignogno/NOAA**
- **Jim Ellickson/NOAA**
- **Madeline Butler/501**
- **Tom Bialas/514**

Landsat 7 Processing System CDR

Purpose and Scope

- **Purpose of CDR**
  - **Present synopsis of LPS Detailed Design Specification and related design material**
- **Scope of LPS Detailed Design**
  - **Detailed design encompasses:**
    - » **Defining detailed design for software and hardware CI's**
    - » **Refining detailed inter-subsystem interfaces, refining external interfaces**
    - » **Defining a detailed design for the operator-system interface**
    - » **Defining a detailed design for the database**
    - » **Refining operations scenarios**
    - » **Performing further studies and prototypes to guide design**
    - » **Defining final test plans**
    - » **Documenting the above in specifications, ICD's, plans, etc**

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Documentation

- **Accompanying Documentation**
  - **LPS Detailed Design Specification**
  - **LPS Interface Definition Document**
  - **LPS-IAS Interface Control Documentation**
  - **LPS System Integration and Test Plan**
  - **LPS Build Implementation Plan**
  - **LPS User's Guide (Preliminary)**
  - **LPS Output Files Data Format Control Book**

- **All documentation is available on-line from the Landsat Processing System server. Instructions for access are included in the back of the package**

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Review Item Dispositions

- **Please submit RIDS to: Phil Province (bldg 23, RM C429, 286-7731) no later than December 8, 1995**

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LPS SDR/SSR Follow-up

- **23 RIDS and 5 Action Items received as result of the LPS SDR/SSR conducted March, 1995**
  - **All RIDS were responded to and concurred by the originator. Appropriate documentation was updated as necessary.**

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RID/AI Summary

Major Catagories of RIDS

- **Inconsistencies in System Design Spec and Software Requirements Spec.**
  - Inconsistencies were corrected in signature version of SDS and SRS
- **Failover and use of Integration and Test Recorders**
  - Approaches to use of the Integration and Test Recorders were provided
- **Metadata Contents updates**
  - Appropriate fields were added to the metadata contents and F&PS was updated accordingly
- **Data Quality Assurance and Trending Analysis**
  - Working with Project Science Office to provide impacts to the Project
- **LGS Interface Control Document Comments**
  - Items were incorporated into the signature version of the ICD

Action Item Summary

- **AI 03-09-95-01 Confirm contact period duration**
  - 14 minutes is the maximum contact duration for EDC 0 Degree Acquisition Circle
- **AI 03-09-95-02 Use of hardware for some LPS functions**
  - Trade studies were performed and presented as part of the LPS System Design Review showing that a predominantly software approach was advantageous, cost effective, and feasible
- **AI 03-09-95-03 Identify alternative RAID hardware vendors**
  - Alternatives are available in industry and identified in Action Item response

Action Item Summary

- **AI 03-09-95-04 Obtain written statements for vendor support and demonstrate that s/w is portable**
  - Written statements are attached to action item response.
  - Software portability is not a requirement, however, LPS has adopted proven approach for minimizing portability problems. LPS will be POSIX compliant were ever possible and isolate and clearly document any non-POSIX implementations. This has been proven effective by Pacor II portability exercises.
  - Working with SGI to obtain continued support for the device drivers for data capture

- **AI 03-09-95-05 Use of Spacecraft I&T Recorders**
  - Covered under RID Response

Functional Requirements

- Receive and record raw Landsat 7 wideband data from the LGS for 4 wideband data inputs simultaneously on a contact basis
- Perform CCSDS Grade 3 Service on all received wideband data
- Perform BCH Error Detection and Correction on all wideband data
- Generate Level 0R data files on a subinterval basis
- Generate Browse Data files on a scene basis
- Generate Metadata data files on a subinterval basis
- Provide return link quality and accounting as part of metadata
- Perform Automated Cloud Cover Assessment
- Identify WRS scene boundaries
- Coordinate the transfer of all Level 0R related data files to the Land Processes (LP DAAC)

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High Level Requirements (cont)

Performance Requirements

- Receive and record the raw wideband data at 75Mbps for each input data stream
- Process the equivalent of 250 ETM+ scenes per day
- Process and notify the LP DAAC of data availability within 16 hours of receipt of data
- Provide the capability to reprocess up to 10 percent of the wideband data on a daily basis
- Retain raw wideband data for a minimum of 30 days from time of receipt
- Process received wideband data at an average aggregate rate of 12 Mbps (goal is to process at an average aggregate rate of 30 Mbps, which is 7.5Mbps per input string)
- Sustain operations 24 hours a day, 7 days a week for a minimum mission life of 5 years

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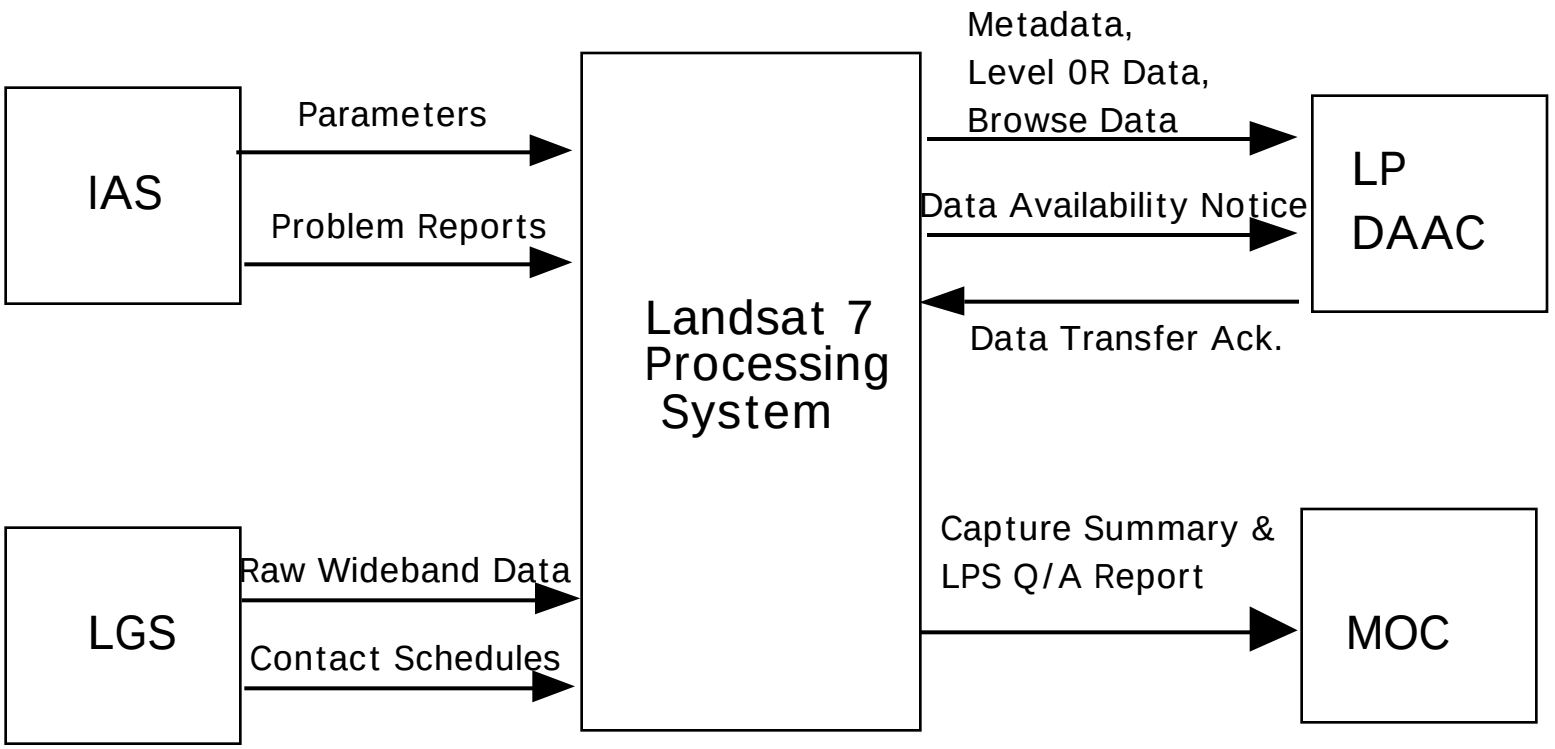
LPS Context Diagram



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LPS Context Diagram

- LGS
  - » Coordinate with LGS to capture raw wideband data on contact basis
  - » Receive raw wideband data at 75 Mbps on four physical channels
- MOC
  - » Provide data receive summary report
  - » Provide non-nominal return link quality statistics
- IAS
  - » Receive Parameters for sensor alignment and scene identification
  - » Receive anomalous image quality statistics
- LP DAAC
  - » Notify LP DAAC of data availability
  - » Receive Data Delivery Notice from the LP DAAC

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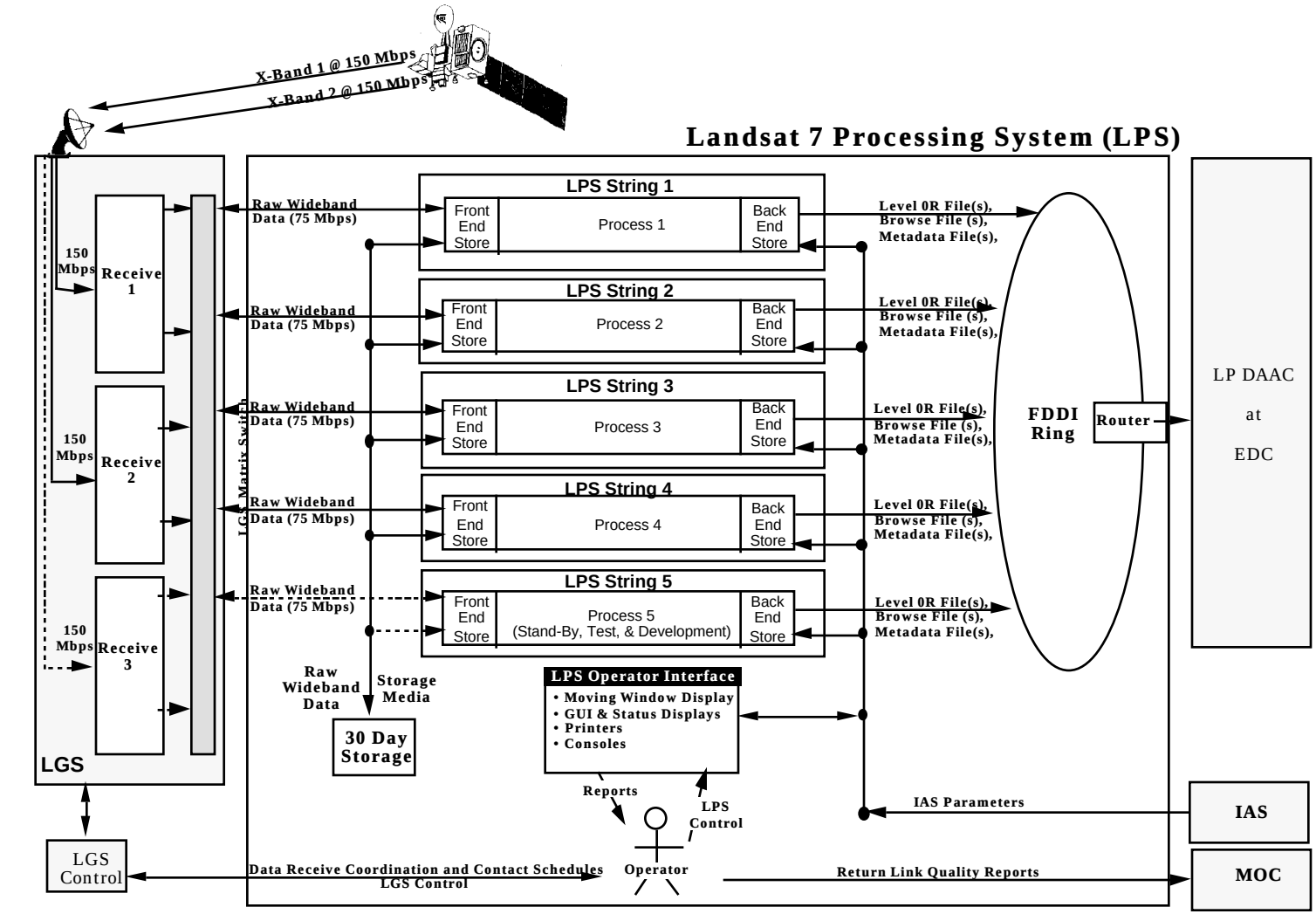
Operations Concept



LPS Functional Block Diagram